Nebraska Public Health Laboratory Newsletter

A publication of the Nebraska Public Health Laboratory (NPHL) at the University of Nebraska Medical Center.
www.nphl.org 1-866-290-1406 Summer 2016

NPHL Updates

By Peter C. Iwen, PhD, D(ABMM), Director, NPHL

Zika virus….these words provide anxiety to an individual when heard and certainly cause medical care givers to ponder the next steps needed for the laboratory evaluation of a patient with the potential to have this disease. Jeff Hamik, Vectorborne Epidemiology Surveillance Coordinator provides in this newsletter information on when to test patients for Zika virus infection and what the state is doing to monitor both the medical community and the local environment to provide ongoing surveillance for transmission of this pathogen in Nebraska. To add to the concerns of Zika virus infection, Nebraska is also in the midst of a mumps outbreak that has expanded into a number of communities within the state. To help in the outbreak investigations, the NPHL has been offering guidance on the appropriate laboratory tests for mumps diagnostics and will continue to do so with the anticipated exposure risks that may be associated with schools starting in the fall.

To expand on NPHLs involvement with laboratory diagnostics, the national emphasis on "Culture of Safety" for the clinical laboratories has been a concept that is not new, but has been re-emphasized in the laboratory due to the national tread in the potential of hospitals to care for patients infected with a high-risk pathogen. An article by Karen Stiles, our state training coordinator and an introduction to Roxanne Alter, our new state biosafety officer, describe in more detail how NPHL is providing training in these areas to laboratorians. Both of these individuals are available to help laboratorians as they develop and enhance biosafety and biosecurity programs for their medical facilities.

Finally, Dr. Randal Fowler describes a recent validated assay to detect microbial causes of meningitis and encephalitis, Amy Kerby illustrates NPHLs participation in a new CDC surveillance program for cryptosporidiosis (CryptoNet); and David Moran describes a novel assay to detect for vitamin B12 deficiency. As always, NPHL is available to help as needed.

INSIDE THIS ISSUE:

Culture of Safety Empathized in Nebraska

by Karen Stiles SM(ASCP)^{CM}, State Training Coordinator NPHL

It is inevitable with the national news of nursing staff infected with Ebola virus and over 70,000 U.S. patient deaths from hospital acquired infections in 2012, that biosafety clearly has become a major focus of this year. Reimbursement regulations have changed and now require reductions in errors and penalize readmissions and infection-related lengths of stay. Joint commission reported that about half of the hospitals inspected do not have certified infection prevention specialists on staff in 2014.[1]

Laboratory acquired infections (LAI) and exposure data is scarce due to a lack reporting requirements. Initial data from 1986 showed that 3.5/1000 LAIs occurred in hospital laboratories and 1.4/1000 occurred in public health laboratories. In 2005, the CDC reported that *Neisseria meningitidis* accounted for a substantial number of LAI's, with 20/100,000 microbiologists compared to the 0.3/100,000 in the general public[1]. Additionally, non-microbiology laboratories are not immune. Needle punctures, acid or alkali spills, glass cuts and splash in the eye were the most noted in several clinical laboratories, while aerosols from centrifuges, removal of tube stoppers or tube breakage have been major causes of injury more specifically in the hematology laboratories.

In 2008, the CDC organized a Blue Ribbon Panel to review laboratory biosafety in the diagnostic laboratory[1]. The guidelines developed by the panel were supported by evidence based data and recommendations were made with common-sense approaches. This document supplements the 5th edition of *Biosafety in Microbiological and Biomedical Laboratories* (BMBL), developed by the CDC and the National Institutes of Health.

The "culture of safety" encourages laboratories to promote an organizational philosophy of systematic risk assessment of all work processes and procedures, to identify safety hazards and implement plans to mitigate risks. Safety must become a top priority and start with managements involvement in order to be successful. Laboratory leaders must provide safety training for their staff, and ensure competency by exercising scenarios which potentially could occur.

The Nebraska Public Health Laboratory, with the assistance of funding from the CDC, has hired a new subject matter expert, Roxanne Alter, to facilitate this culture of laboratory safety in our state. Her story can be found in *Meet the Laboratorian* on page 7 of this newsletter.

References:

1. MMWR Supplement; *Guidelines for Safe Work Practices in Human and Animal Medical Diagnostic Laboratories;* Jan 6,2012.

Mumps Outbreaks in 2016

by Karen Stiles SM(ASCP)^{CM}, State Training Coordinator NPHL

Mumps is best known to cause puffy cheeks and a swollen jaw, as a result of swollen salivary glands (parotitis). Common symptoms also include fever, headache, muscle aches, tiredness and loss of appetite. Symptoms appear 16-18 days after exposure, but can range from12-25 days. Some individuals have mild or no symptoms. Occasionally complications do arise in adults, with encephalitis, meningitis, deafness or inflammation of ovaries or breasts in females and inflammation of the testicles in males who have reached puberty. Rarely, mumps can lead to fertility problems.

Since the pre-vaccine era, mumps has decreased more than 99% in the United States with the measles, mumps, rubella (MMR) trivalent vaccine. Yet, in 2016, mumps has been reported in 33 states with over 1200 infections. Four states in the Midwest alone, have reported more than 100 case each, including IA, IN, IL and MA. So, it's not surprising that Nebraska has seen its fair share of cases as well.

Historically, mumps outbreaks can vary from a few hundred to a few thousand each year. According to the CDC's Morbidity and Mortality Weekly Reports (MMWR), the United States experienced a multi-state outbreak in 2006, involving more than 6500 reported cases, predominately in college-age students across the Midwest. Again in 2010, about 2600 high school-age students in New York City, were affected. The lowest numbers of annual cases in recent history were reported in 2012, with only 229 cases[1].

The efficacy rate for the first dose of MMR is 78% and 88% for the second dose. However, mumps outbreaks can occur even in institutions which require by law the two dose MMR vaccine. Although widespread immunization has dramatically decreased the cases of mumps, the highly contagious nature of the disease and major factors such as the crowded environments of schools and sporting events can lead to outbreaks even affecting individuals who have been vaccinated[2].

Outbreaks in Nebraska have been reported to affect individuals at colleges[3], universities[4] and camps[5] within our area, with 42 cases confirmed to date of this publication. Mumps has also been particularly prevalent in college students in Iowa, Indiana, and Massachusetts this year. Although not confirmed, one of these states may represent the original source for our first case at a local college in April, according to Blake Hendrickson, MPH; VPD Epidemiology Surveillance Coordinator at NeDHHS in Lincoln. Blake states that when dealing with a highly contagious virus, cases will continue to appear leading to an expansion of the outbreak. He is confident, however, as more education is provided to the public and healthcare community, that cases will be identified earlier in their course of symptoms. This will lead to earlier recognition of disease with appropriate isolation methods to prevent exposures and thus reduce cases of disease. Identification and isolation of infected persons is a key component to breaking the transmission cycle. In addition, the State Office of Epidemiology is providing guidance to colleges and universities as a means to recognize cases as the fall semester begins in August.

To prevent mumps, the CDC recommends children routinely receive 2 doses of the MMR vaccine, once about 1 year of age and again at 4-6 years of age. Although adults born before 1957 are generally considered to have evidence of immunity, recommendations are that healthcare personnel do show documented evidence of immunity and if not present consider re-vaccination. The state of Nebraska also encourages everyone to be up-to-date with this recommended vaccination schedule. Anyone who has no documentation of a past mumps infection or does not recall receiving two doses of the MMR vaccine, should contact their healthcare provider to determine if a booster immunization is recommended.

For the early recognition of disease, laboratory testing is encouraged during the first 3-4 days of symptoms by collecting a buccal swab (using the appropriate collection container) and submitting this for PCR testing. After 4 days of symptoms however, mumps virus RNA is difficult to detect. After this time, IgM serologic testing becomes the more accepted method for diagnosis. However, to confirm an outbreak does require culture or a positive PCR test. The medical care team, in collaboration with the county public health department, must approve for the state to cover the costs of this initial testing. Once an outbreak extension has been confirmed, then follow-up testing of exposed individuals with IgM serology only, is appropriate and subsequently handled by patient's private insurance.

For additional information on laboratory testing for mumps, contact NPHL at (866) 290-1406 or refer to the NPHL website at http://nphl.org.

References:

1. 1. "*About Mumps"*, May 29, 2015, CDC.gov <http://www.cdc.gov/mumps/about/index.html>
2. 2. Zhang, Sarah, wired.com, "*No, Harvard's Mumps Outbreak doesn't mean vaccines are bunk,"* April 29, 2016
3. 3. NeDHHS News Release: *DHHS Reports Increase in Mumps Cases*, May 31, 2016, <http://dhhs.ne.gov/Pages/newsroom_2016_may_mumpsincrease.aspx>
4. 4. Call for Cases: Mumps Exposure, Incoming Freshmen and their Families, Creighton University -- Omaha, Nebraska, 2016, <https://epix2.cdc.gov/v2/Reports/StandardReport/Display.aspx?id=59822&print=False&PSR=True>
5. 5. NeDHHS HAN Update: *Measures to Control Mumps Outbreak Including Mumps Vaccine*, June 8, 2016; <http://dhhs.ne.gov/publichealth/han%20Documents/UPDATE060816.pdf>

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Zika Virus

By Jeff Hamik, MS, DHHS Vectorborne Epidemiology Surveillance Coordinator

Zika virus (ZIKV) has caused an emerging disease that is linked to microcephaly and other birth defects in infants during pregnancy. This virus is spread primarily by mosquito bites from infected *Aedes aegypti* mosquitoes and by *Aedes albopictus*[1]. Transmission can also occur from a symptomatic, infected male partners to their sexual partners, from infected mothers to their unborn infants, and from infected donated blood or tissue.

To help with clinical diagnosis of ZIKA infection, lab testing of individuals who meet CDC's criteria is done at the CDC Arboviral Branch Laboratory. The CDC ZIKV testing criteria are:

- One of these symptoms: acute fever, rash, arthralgia, or conjunctivitis AND travel to area with ongoing transmission within 2 weeks of symptom onset;
- Pregnant female with clinical illness consistent with ZIKV disease (one or more of the above symptoms) AND history of travel to area with ongoing ZIKV transmission the previous 2 weeks;
- Pregnant female without clinical illness consistent with ZIKV disease with history of travel to area with ongoing ZIKV disease (testing should be performed 2-12 weeks after travel);
- Pregnant female who have had unprotected sex with a male partner with history of travel to area with ongoing ZIKV transmission AND female develops at least one symptom of ZIKV clinical illness;
- Pregnant female who have had unprotected sex with a male partner with history of travel to area with ongoing ZIKV transmission AND male sexual partner has clinical illness consistent with ZIKV disease or has been diagnosed with ZIKV disease.
- Pregnant female who traveled to area with ongoing ZIKA transmission 8 weeks prior to conceiving.

NPHL is currently building capacity to test specimens for ZIKV. RT-PCR testing will be available on blood, urine and CSF starting August 1, 2016. The serological test for ZIKV antibody is still in the developmental stages.

To date (7/19/2016), 144 specimens have been submitted to CDC from Nebraska residents with 133 results reported and 11 pending. Three of the specimens sent to CDC have been positive for ZIKV, two positive for an unspecified flavivirus, and 128 negative. NPHL has also received results back on 4 residents of Nebraska who saw providers in Iowa and was submitted by Iowa to the CDC. Results received show that all 4 were negative. Results have also been received on 17 Nebraska residents whose specimens were submitted to private commercial laboratories. Of those, 16 were negative and one was positive.

In summary, 165 have been tested fro ZIKV with 154 results received. Four specimens have been positive ZIKV with no pregnant female has tested positive for Zika virus. In addition, Nebraska is participating in the CDC U.S. ZIKV Pregnancy Registry.

The threat of local transmission is remote in Nebraska since the *Aedes aegypti* mosquitoes have not been detected and only rare counties have been positive for *Aedes albopictus*[2]. Nebraska DHHS is piloting a trapping program to screen for these *Aedes* mosquitos in Eastern Nebraska along with routine West Nile virus mosquito surveillance.

Currently, the highest threat to Nebraska residents is travel to countries with active ZIKV transmission. Travelers are strongly encouraged to practice proper mosquito prevention while visiting. Upon returning, travelers should avoid mosquito bites for three weeks to avoid chances of infecting local mosquitoes. Due to the risk of microcephaly and birth defects from ZIKV during pregnancy, pregnant female and couples trying to conceive are strongly encouraged to avoid travel to areas with ZIKV transmission.

For additional information on laboratory testing for ZIKV, contact NPHL at (866) 290-1406 or refer to the NPHL website at http://nphl.org.

References:

1. Hahn, M; Eisen, R; Eisen, L; Boegler, K; Reported Distribution of *Aedes (Stegomyia) aegypti* and *Aedes (Stegomyia) albopictus* in the United States, 1995-2016; Med Entomol, 2016, 1-7; doi: 10.1093/jme/tjw072.

2. Janousek, T; Records of *Aedes albopictus* in Nebraska with notes on its biology; Amer Mosq Cont Assoc, 17(4):265-267, 2001.

Upcoming NPHL 2016 Events

BT Proficiency Test
LPX - CDC Shipping Sept 6
Nebraska Challenge Shipping - Sept 6
Post Challenge Webcast - Sept 23 Noon

BT Training - Full Day Workshop
Omaha @NPHL - Oct 14
Scottsbluff @ WNCC Nov 8 (tentative)
Onsite Training - Call to schedule

CT Mass Specimen Collection Exercise
Omaha @ Methodist Hospital Oct 28

Gram Stain Workshop
Scottsbluff @ WNCC Nov 9 (tentative)

Upcoming NPHL 2017 Events

Chemical Terrorism Webinars
January-February

Packing & Shipping Training
Omaha - May (tentative)
Sioux City - May (tentative)

What Kind of Shape is Nebraska's Public Heath?

By Amy Kerby MT(ASCP), Microbiology Specialist, NPHL

Nebraska is one of 7 states participating in a new CDC surveillance program called CryptoNet. This is a molecular based tracking system to better understand *Cryptosporidium* transmission in the U.S. Identifying the species, genotypes and subtypes of *Cryptosporidium* helps to track the source of infection and thereby implement best control measures.

Cryptosporidium, a protozoal parasite, causes a long-lasting diarrheal illness that can be life-threatening in immunocompromised people. This disease is spread from humans or animals, particularly cattle, via water, food, animal-to-person, or person-to person. The parasite's extreme tolerance to chlorine has allowed this parasite to emerge as a leading waterborne pathogen. Due to this, *Cryptosporidium* is now the leading cause of infection outbreaks associated with swimming pools. Since 2004, annual reports of cryptosporidiosis have risen >3-fold in the U.S.

Nebraska is an ideal state to participate in the CryptoNet project due to our rural demographics and large cattle population. With 1 out of every 4 jobs in our state related to agriculture, we have a unique setting in which potential transmission of *Cryptosporidium* could impact public health according to State Foodborne Epidemiologist Dr. Anna Carlson. Thus, the geographic uniqueness of Nebraska provides a good source to study *Cryptosporidium*.

To study this disease, the goal is to collect stools that are positive for *Cryptosporidium* from different parts of the state are then forward these to the CDC's CryptoNet lab for characterization. In March 2016, a notice was sent to all clinical laboratories across Nebraska requesting positive stools for *Cryptosporidium*, as well as *Cyclospora* and *Giardia* to be submitted to the NPHL. Positive tests may include:

1. Rapid card or lateral flow assay i.e. Xpect, Alere, ColorPac, TechLab, or other approved rapid card tests
2. Stool Immunoassay i.e. EIA microplate
3. Direct Fluorescent antibody (DFA) or Direct Immunofluorescent Antibody (IFA)
4. Staining & microscopy i.e. modified acid fast stain
5. PCR i.e. Luminex, Hologic, BioFire, BD Max, Verigene, or other lab-developed test
6. Conventional Ova and Parasite exam

Specimens submitted for *Cryptosporidium* molecular epidemiology must be collected in an acceptable preservative compatible with molecular methods. These include commercial fixatives (TotalFix, modified PVA [Zn- or Cu -based], and EcoFix) and transport media (Cary-Blair, Enteric Plus, and ParaPak). Preserved specimen can be shipped at ambient temperature and should be submitted with 72 hours.

If necessary, unpreserved stool can be sent if the fresh stool is placed in a clean container as quickly as possible and kept under refrigeration until same day pick-up or overnight delivery can be arranged. The shipper must ensure the specimen remains cold during transport by using available packing materials such as cold-packs.

Specimen labeling is subject to CLIA regulations, therefore, two forms of patient identification are required on the specimen label and the test request form. The shipper must follow regulations describing the requirements for proper packaging and shipment of Category B, Biological Substances, UN3373.

The test methodology used to detect the positive samples is important to know for the CDC study, in order to compare methods and results from our state with national data. The methodology used by testing laboratory can be captured on the updated NPHL Special Microbiology Test Request Form, by marking the specific technique on the line indicated at the arrow, "**Test method used to detect positive**" as seen in **Figure 1**.

Unfortunately, stools collected in the traditional formalized transport containers are not useful for molecular detection. For this reason, certain fixatives/preservatives are not recommended for molecular detection, including formalin, SAF, and LV-PVA.

Further information will be available on the NPHL Test Directory, http://nphl.org/ under *Cryptosporidium, Cyclospora or Giardia;* Molecular Epidemiology.

As of May 24 this year, 22 positive *Cryptosporidium* stools have been evaluated. The results have shown, a

(Cryptosporidium, Continued on page 5)

Figure 1. NPHL Special Microbiology Test Request form

	STOOL CULTURE INDEPENDENT ISOLATION AND ID Stool positive for GI pathogen by PCR or EIA **(NAAT)**
⇨	Test Method used to detect positive: **(BNK)**
	Indicate target(s): ___Cryptosporidium ___Cyclospora ___E.coli O157(HECCU) ___Giardia ___STEC(HECCU) ___Salmonella ___Vibrio ___Yersinia ****Do Not send in formalin-SAF, PVA, Protofix****
	Positive stool for shigatoxin by EIA (confirmation) **(HECCU)**
	OTHER:

Methylmalonic Acid Testing by NPHL

By David Moran, MT (ASCP), Technical Supervisor of Chemistry

In November of 2014, the NPHL in conjunction with the Special Chemistry section of Nebraska Medicine, began offering methylmalonic acid (MMA) testing in-house. MMA testing is for diagnosing cobalamin (vitamin B12) deficiency. Data has shown that B12 deficiency occurs in adults over 51 at a rate of 3.2%.

The body's ability to absorb B12 from the diet decreases with age, but most people can readily use supplemental forms from vitamins or shots. Adequate B12 stores in the body are required for numerous neurological and hematological processes. The main problems associated with B12 deficiency are neurological damage, pernicious anemia, and B12-associated megaloblastic anemia. Because of this, prompt diagnosis is required to prevent irreversible neurological damage. Patients who are currently experiencing a deficiency and have started to show signs and symptoms are usually quickly diagnosed. However, those with mild or subclinical symptoms and deficiencies are less likely to be screened for B12 levels. In these cases the deficiency is not diagnosed until complications manifest.

Diagnosis of B12 deficiency by the B12 level alone is not always straightforward. Typically with a low B12 level and hematologic changes, one can say that a deficiency is present. However, not all patients show hematologic changes and waiting until this point is detrimental to the patient. Many conditions, including pregnancy, oral contraceptive use, and folate deficiency can all cause falsely low B12 values in the laboratory. Plus, 20 – 40% of elderly patients exhibit low B12 levels but do not actually have a clinical deficiency. On the other side, liver disease, renal insufficiency, and other diseases can cause falsely normal B12 serum levels. In cases where symptoms are present but levels are normal, further investigation is warranted and typically done with homocysteine and MMA levels.

Vitamin B12 is required for synthesis of methionine from homocysteine and for conversion of methylmalonyl coenzyme A to succinyl coenzyme A. Thus, in cases of B12 deficiency both homocysteine and MMA will be elevated. However, homocysteine levels are elevated with other conditions, including the body producing increased levels of this chemical (familial hyperhomocysteinemia). Because of this, the MMA test is more specific, but in most cases both tests are performed in screening or for a confirmation of B12 deficiency. The normal range for MMA levels is typically <0.3 µmol/L, but most patients with a deficiency will show levels > 0.4 µmol/L. In patients with elevated levels of both homocysteine and MMA and with decreased levels of B12, a few other conditions such as renal insufficiency must be ruled out before confirming the vitamin B12 deficiency. The test is performed at NPHL on a gas chromatography mass selective detector (GC-MS) and is done on serum. No special instructions are required for the patient.

References:

1. Carmel, R., Green, R., Rosenblatt, D. S., & Watkins, D. (2003). Update on cobalamin, folate, and homocysteine. Hematology, 62-81.

2. Evatt, M. L., Mersereau, P. W., Bobo, J. K., Kimmons, J., & Williams, J. (2008, June 30). Why Vitamin B12 Deficiency Should Be on Your Radar Screen. Retrieved from Centers for Disease Control and Prevention: http://www.cdc.gov/ncbddd/b12/index.html

(Cryptosporidium, Continued from page 4)

variety of different species associated with disease (**Table 1**). Epidemiological studies are ongoing to evaluate these cases further to define how the data can be used most effectively for outbreak investigations.

Future studies to evaluate *Cyclospora* and *Giardia* are also ongoing as well. The Nebraska Public Health Laboratory has been working with the CDC to provide samples to help in the validation process to define a new program to study these parasites as well. This study is a collaborative effort among the CDC, NPHL, and the state foodborne Epidemiologist office.

Table 1. CDC Classification of *Cryptosporidium* -positive specimens to date for Nebraska

Species	Number	Comment - various exposure risks
C. hominis	13	
C. parvum	5	colitis, travel to Mexico (drank from river)
C. felis	1	immunocompromised, hot tub, bulldogs
C. ubiquitum	1	no travel, no symptoms, evaluation as a fecal transplant donor
C. canis-like, chipmunk genotype 1	2	possible squirrel exposure
Total	22	

Meningitis and Encephalitis Testing is on "Fire"

By Randal C. Fowler, PhD, Clinical Microbiology Fellow

Meningitis and encephalitis are inflammatory conditions of the brain and/or meningeal tissues surrounding the brain caused by a variety of infectious and non-infectious agents. Bacterial meningitis is considered rare with the advent of vaccines. However, this infection can potentially be a lethal acute illness where symptoms appear abruptly and escalate rapidly to include brain damage, hearing and speech impairment, or even death[1,2]. Conversely, viral meningitis is more common and typically is considered non-lethal with milder symptoms.

Each year in the United States, >70,000 meningitis and >20,000 encephalitis-related hospitalizations occur with mortality rates as high as 11.4% and 17.1%, respectively [3,4]. The individuals most at risk for both illnesses are infants, older adults, and those who are immunocompromised. The infectious agents associated with meningitis or encephalitis can be dependent on epidemiological elements such as host and geographical factors, season, and exposure history.

However, the clinical management of individuals with meningitis or encephalitis can vary and often depends on the initiation of appropriate therapy based on the identification of the underlying cause of infection. The clinical diagnosis of meningitis and encephalitis can be difficult due to the nearly indistinguishable clinical signs and symptoms. Delayed diagnosis and treatment are associated with increased morbidity and mortality[4]. Therefore, rapid identification of the specific etiology of meningitis or encephalitis is crucial for selecting and administering effective therapy.

To this end, technology is evolving to provide more rapid and reliable diagnosis of meningitis and encephalitis. This is evident by the introduction of cryptococcal antigen lateral flow assays to diagnose cryptococcosis and laboratory developed nucleic acid amplification tests (NAATs) for diagnosing bacterial, viral, and fungal infections. Recently, the FDA approved the first cerebrospinal fluid (CSF) NAAT for the detection of multiple pathogens that can cause central nervous system infections. This assay, known as the FilmArray Meningitis/Encephalitis Panel (ME), is capable of concurrently detecting 14 bacterial, viral, and yeast pathogens directly from CSF. Similar to other syndromic panels, the FilmArray ME is a disposable and fully enclosed system that contains all the molecular components required to extract, amplify, and detect nucleic acid from multiple meningitis and encephalitis causing pathogens within a single CSF specimen obtained by a lumbar puncture. This qualitative diagnostic test only requires 0.2 mL of CSF, has limited hands on time, and is able to provide a quick turnaround time of approximately one hour.

Initial verification of the ME panel in our laboratory included the testing of contrived CSF specimens using nucleic acids, inactivated microorganisms, and known quantities of microorganisms detected on the FilmArray ME Panel **(Table 1).** A true negative CSF specimen determined by the FilmArray ME was used as the diluent. The contrived specimens were made by inoculated nucleic acid or microorganisms into the CSF diluent; samples were pooled to ensure testing efficiency. Each pool, which included the microbial pathogens, was tested in duplicate across two days to examine assay reproducibility and day-to-day variation. In addition, CSF specimens representing clinical CSF samples that were previously determined to be positive for one or more of the 14 pathogens or negative for all pathogens were tested singly. Results from the verification study showed that the sensitivity and specificity of the FilmArray ME Panel were consistent with previous studies[5,6].

The implementation of the FilmArray ME in the clinical and public health laboratory is expected to improve the number of pathogens detected and significantly shorten the time to identify infectious causes of meningitis and encephalitis; although this assay is not without some limitations. First and foremost, a negative result does not rule out infection or coinfection with organisms not included in the FilmArray ME Panel. Secondly, this method has not been validated for specimens collected from indwelling central nervous system medical devices (e.g. shunt patients). Finally, culture-independent testing, such as this assay, requires supplemental culture to obtain an isolate for antimicrobial susceptibility testing and epidemiological studies (i.e. serotyping).

Future studies with this panel will assess the impact this assay has on patient care and outcomes. Additional information on this assay can be obtained by contacting Dr. Fowler at *randy.fowler@unmc.edu.*

Table 1. FilmArray® Meningitis/Encephalitis Analytes

Bacteria	**Viruses**
Escherichia coli K1	Cytomegalovirus
Haemophilus influenzae	Enterovirus
Listeria monocytogenes	Herpes simplex virus 1
Neisseria meningitidis	Herpes simplex virus 2
Streptococcus agalactiae	Human herpesvirus 6
Streptococcus pneumoniae	Human parechovirus
Yeast	Varicella zoster virus
Cryptococcus neoformans/gattii	

References:

1. Brouwer MC, Tunkel AR, van de Beek D. 2010. Epidemiology, diagnosis, and antimicrobial treatment of acute bacterial meningitis. Clin Microbiol Rev 23:467-492.
2. Edmond K, Clark A, Korczak VS, Sanderson C, Griffiths UK, Rudan I. 2010.Global and regional risk of disabling sequelae from bacterial meningitis: a systematic review and meta-analysis. Lancet Infect Dis 10:317-328.
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5. Biofire FilmArray® Meningitis/Encephalitis (ME) Panel [package insert]. Salt Lake City, UT: Biofire Diagnostics, LLC; 2016.
6. Leber, A.L., et al. 2016. Multicenter evaluation of the BioFire FilmArray Meningitis Encephalitis Panel for the detection of bacteria, viruses and yeast in cerebrospinal fluid specimens. J Clin Micro. doi: 10.1128/JCM.00730-16.

Meet NPHL's Newest Member, State BioSafety Officer - Roxanne Alter

I would like to re-introduce myself since many may already know or recognize me. I want to take time to tell you a little bit about my past and my plans in my new position as the Nebraska State Biosafety Officer.

Although I grew up in Kansas City, my parents were native Nebraskans. Consequently, our family always had a Nebraska connection. We grew up with Nebraska Huskers and Go Big Red. I am the oldest of 6 children with a father that was a salesman and a stay at home mom. She was a devote Irish Catholic but added a crazy Irish lifestyle while my father added the OCD structure.

My early education occurred at St. Catherine's grade school and Bishop O'Hara High School in Kansas City where I dreamed of being a scientist. I went to college and graduated at the University of Missouri at Kansas City with a Bachelor of Science in Biology. Although doing research was my original intension after graduation, it did not take me too long to figure out that I could not work in a clinical laboratory without additional training. Therefore, I ended up at Research Medical Center Kansas City at hospital based Medical Technology program. During my training, I met Maureen Hunter, who eventually worked at Providence hospital in Wayne, NE at and Tammy Walker, who ended up working at Boone County Hospital in Albion, NE.

My first job in Omaha was at the Internal Medicine and Associates doctor's office at Clarkson Tower. Following two years performing hematology and chemistry assays at this office, I subsequently went to Lutheran Hospital (which is no longer in operation) and worked in Blood Bank. Occasionally I would cover the night shift performing a variety of laboratory tests as a generalist medical technologist. At Lutheran Hospital, I perfected my phlebotomy skills as most patients were elderly. This experience served me well when I began teaching.

In 1983, I joined the Pathology laboratory at University Hospital in Omaha, working in the Bone Marrow Culture Laboratory. This laboratory was a startup support laboratory for the Autologous Bone Marrow Transplant program at the time. Phyllis Muellenberg, the Program Director of the Medical Technology Program, recruited me as instructor, where I became a teacher in this education program for 20 years. I had the opportunity to provide education for both clinical laboratory students, mid-level practitioners and medical students.

From 2000 to 2015, I worked for Dr. Paul Fey, Director of Clinical Microbiology for Nebraska Medicine. I used my clinical laboratory skills for research projects. In Dr. Fey's lab, I helped validate the GI panel (BioFire) and worked on several antibiotic resistance studies, including the evaluation of resistance across the state of Nebraska. I also performed studies on the detection of biofilm orthopedic explanted knees and hips. Two project that I worked on involved international trips, to Nigeria and Haiti. In these trips, I was tasked to evaluate the ability of local clinical laboratories to identify and characterize antibiotic resistance in patient specimens. These visits were incredibly rewarding to me with the opportunity to provide training and suggestion for improvement in laboratory processes.

In October 2015, I took another giant leap into the unknown by accepting a position at the NPHL as the new State Biosafety Officer. This position, which is funded by the CDC, was developed to evaluate laboratories across the state to give an overall picture of the condition and or safety of our clinical facilities in Nebraska and provide a risk assessment of each for the ability to handle high consequence pathogens in an emergency. Following the evaluation, the goal will be to determine specific needs of our clinical laboratories and to seek funds to help cover the cost to improve laboratory safety. It is important to note that I am not a regulatory body and will never disclose specific laboratories in this process.

I will continue to be your advocate for safety and will help to provide a Culture of Safety for all people that practice laboratory medicine. I believe that the job provides me a unique position to help shine a spotlight on the wonderful work that our clinical laboratory practitioners do as they provide vital data to manage the care of patients. As always, I look forward to my visits to your laboratory and am here to help you and laboratory staff. Do not hesitate to contact me at *ralter@unmc.edu* if I can be of help.

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Nebraska Public Health Laboratory Newsletter - Summer 2016

IN THIS ISSUE

The Nebraska Public Health Laboratory Newsletter is a publication of the Department of Pathology and Microbiology, Steven H. Hinrichs, MD, Professor and Chairman, at the University of Nebraska Medical Center. The views expressed here do not necessarily reflect the opinions of the Nebraska Department of Health and Human Services or the University of Nebraska Medical Center.

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